

FIG. 2

OPCODE	COMMAND MEANING
00 0000 0000	NO INFORMATION
00 0000 0001	RESERVED
00 0000 0010	PC TRACE GAP
00 0000 0011	REPEAT INSTRUCTION
00 0000 0100	COUNTER START
00 0000 0101	COUNTER OVERFLOW/COUNTER VALUE
00 0000 0110	RESERVED
00 0000 0111	COMMAND ESCAPE
00 0000 1xxx	EXCEPTION OCCURRED
00 0001 0xxx	TIMING SYNC POINT
00 0001 1xxx	MEMORY REFERENCE SYNC POINT
00 0010 xxxx	PC SYNC POINT/FIRST/LAST/TRIGGER
00 010x xxxx	SAME PC
00 011x xxxx	CPU AND ASIC DATA
00 10xx xxxx	RESERVED
00 11xx xxxx	MEMORY REFERENCE BLOCK
01 xxxx xxxx	BRANCH/BEGINNING OF PARAMETER
10 xxxx xxxx	CONTINUE
11 xxxx xxxx	TIMING

# FIG. 3

### TIMING PACKET EXAMPLES

OPCODE	CYCLE BITS	MEANING
11	00000000	8 CONSECUTIVE CYCLES OF EXECUTION
11	11111111	8 CONSECUTIVE STALL CYCLES
11	11110000	THE RIGHT MOST BITS INDICATE THE PROCESSOR EXECUTED FOR 4 CYCLES AND THEN STALLED 4 CYCLES
11	10101010	THE BITS MEAN EXECUTE, STALL, EXECUTE, STALL, EXECUTE, STALL, EXECUTE, AND STALL RESPECTIVELY

# FIG. 4

### TIMING SYNC PACKET

TIMING SYNC HEADER 3-BIT PC SYNC ID
-------------------------------------

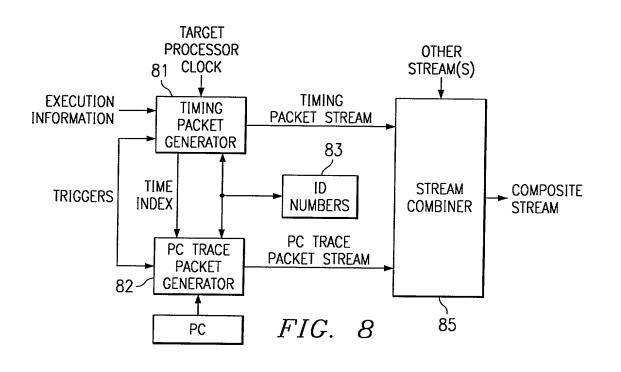
FIG. 5

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PC SYNC POINT TYPES

TYPE	SYNC TYPE	REASON FOR SYNC POINT
000	TRIGGER	USER DEFINED TRIGGER
001	FIRST POINT	STANDBY MODE
010	SYNC POINT	PERIODICALLY GENERATED
011	FIRST POINT	STREAM ENABLED
100	LAST POINT	STREAM DISABLED

FIG. 6

TIME PC SYNC POINT **OPCODE** 00 0010 TYPE (3 BITS) **RESERVED** SYNC ID (3 BITS) 10 RESERVED TIME INDEX (3 BITS) 10 **CURRENT LSB** 10 PC 10 ABSOLUTE 10 **MSB ADDRESS** FIG. 7 **OPCODES** 



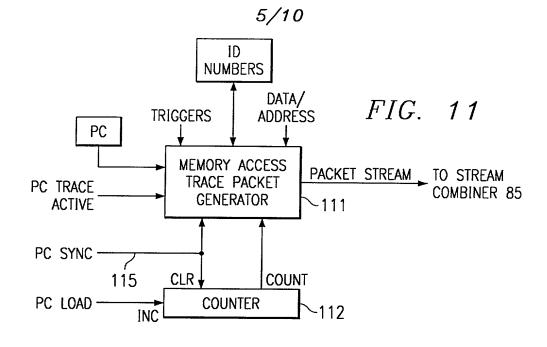
TIME

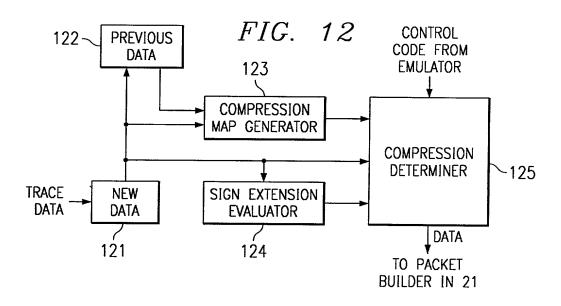
	PACKET S	SEQUE	ENCE
	0011	LD/S1 1 Bl7	DATA, ADDRESS, PC (5 BITS)
01	DATA	BYTE	0 LSB
10	DAT	A BY	E 1
10	DATA	A BYT	E 2
10	DATA	A BYT	E 3
10		A BYT	
10		A BYT	
10		A BYT	
10			BYTE 7
01			BYTE 0 LSB
10			S BYTE 1
10			S BYTE 2
10	MSB DATA	ADDR	ESS BYTE 3
01	NATIVE PC ADDRESS BYTE 0 LSB		OFFSET, BITS 7–0 (8 BITS)
10	NATIVE PC ADDRESS BYTE 1	00	OFFSET, BITS 15-8 (8 BITS) (OPTIONAL)
10	NATIVE PC ADDRESS BYTE 2	OR	NOT NEEDED
10	MSB NATIVE PC ADDRESS BYTE 3		NOT NEEDED
	ADDRESS BYTE 2  MSB NATIVE PC	7.	NOT NEEDED

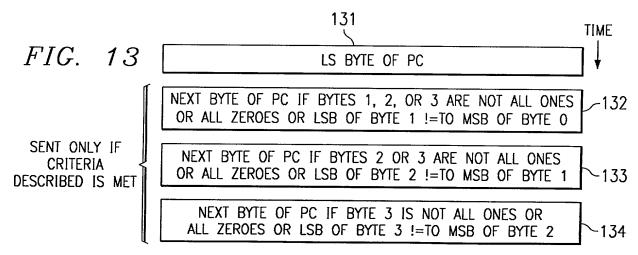
### MEMORY REFERENCE SYNC POINT

OPCODE	PARAMETER FIELD (3-BITS)
00 00011	MSB SYNC ID LSB

FIG. 10







COM	IPRESSION EXAMPLE 0
PREVIOUS DATA	1111111 1111111 1111111 10000011
NEW DATA	#414.1441 11111111 11411111 10000011
COMPRESSION BIT MAP SENT	NONE BECAUSE ONLY ONE BYTE COMPRESSES
SEND BYTES	DROPPED DROPPED DROPPED SENT
	BYTE #0 IS SENT

## FIG. 14

COM	PRESSION EXAMPLE 1
PREVIOUS DATA	#4.1.14.14.11.11.11.11.14.14.14.14.1.10000011
NEW DATA	111111111111111111111111111111111111111
COMPRESSION BIT MAP SENT	NO BECAUSE ONLY ONE BYTE COMPRESSES
SEND BYTES	DROPPED DROPPED SENT
	BYTE #0 IS SENT

## FIG. 15

СОМ	PRESSION EXAMPLE 2
PREVIOUS DATA	#11101111 11101111 10000011
NEW DATA	### <b>###</b> ##############################
COMPRESSION BIT MAP SENT	YES BECAUSE NO SIGN EXTENSION AND TWO OR MORE BYTES COMPRESS
SEND BYTES	DROPPED DROPPED DROPPED SENT
	BYTE #0 IS SENT

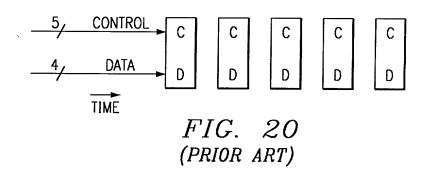
## FIG. 16

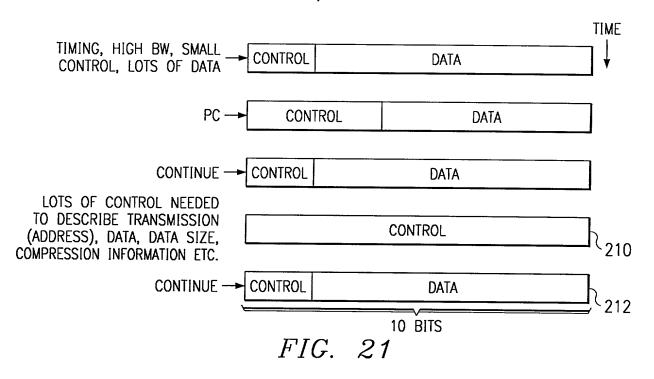
СОМ	PRESSION EXAMPLE 3
PREVIOUS DATA	:00001000:01111110::11000011:10000100
NEW DATA	1111111111111111111111000011110000100
COMPRESSION BIT MAP SENT	YES BECAUSE NO SIGN EXTENSION AND TWO OR MORE BYTES COMPRESS
SEND BYTES	DROPPED DROPPED DROPPED
	NO BYTES ARE SENT

СОМ	PRESSION EXAMPLE 4
PREVIOUS DATA	40000011: 00000100 41111111 11111111
NEW DATA	3431443 1111111 MA41114 11111111
COMPRESSION BIT MAP SENT	YES BECAUSE TWO OR MORE BYTES NOT COVERED BY SIGN EXTENSION COMPRESS
SEND BYTES	DROPPED DROPPED DROPPED
	NO BYTES ARE SENT

FIG. 18

TIME			
	00	DATA HEADER -1	90
	10	DATA COMPRESSION MAP BYTE (8 BITS) = 11011001 - 1	92
	01	LSB DATA BYTE 0 (NOT SENT)	JZ
	10	DATA BYTE 1 (SENT)	
	10	DATA BYTE 2 (SENT)	
	10	DATA BYTE 3 (NOT SENT)	
	10	DATA BYTE 4 (NOT SENT)	
	10	DATA: BYTE: 5: (SENT)	
	10	DATA BYTE 6 (NOT SENT)	
	10	MSB DATA BYTE 7 (NOT SENT)	
0P(	CODES	FIG. 19	





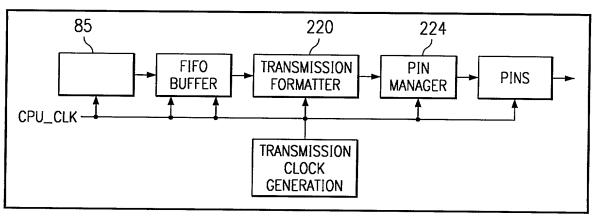


FIG. 22

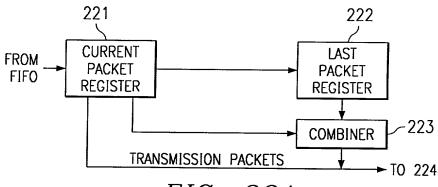


FIG. 22A

6 TRACE PACKETS TRANSMITTED AS 10 TRANSMISSION PACKETS													
10		10		10				10		10			
6	6	6	6 6		6		6	6	6	6			
	TIME →												

FIG. 23

10	10	10	10	10	10
12	12		12	12	12

FIG. 23A

10	10	10	10	10	10	10	10
16		16	1	6	16		16

FIG. 23B

REGISTER 221															F		ISTE 22	R.			
#	# CURRENT TRANSMISSION PACKET										#	# INCOMPLETE TRANSMISSION PACKET									
0	9	8	7	6	5	4	3	2	1	0					El	MPT	Υ				
1	9	8	7	6	5	4	3	2	1 :	0	0	9	8	7	6	5	4	3	2	1	0
1	9	8	7.	6	5	4:	3	2	1	0	1	9	8	7	6	5	4	3	2	1	0
2	9	8	7	6	5	4	3	2	-1.:	0	1	9	8	7	6	5	4	3	2	1	0
$\frac{1}{2}$	9	8	7	6	5	:4	3	2	1	0	2	9	8	7	6	5	4	3	2	1	0
3	9	8	7	6	5	4	3	2	1	0	2	9	8	7	6	5	4	3	2	1	0
								_		_		$\sim$									

FIG. 24

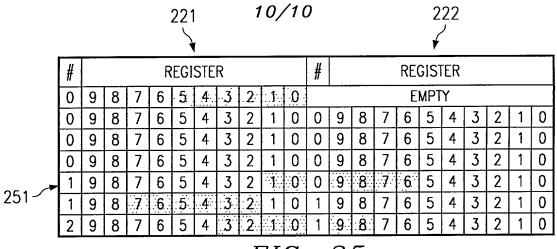
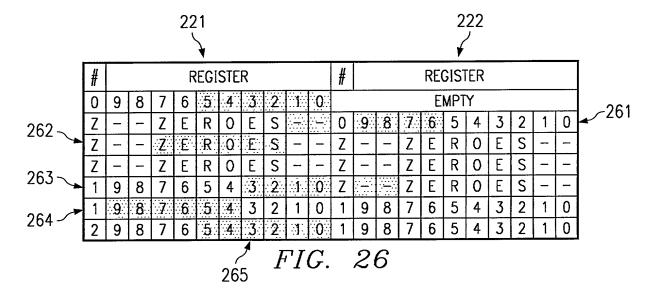


FIG. 25



	<del>\</del>													<b>√</b>											
	#	REGISTER											# REGISTER												
	0	9	9 8 7 6 5 4 3 2 1 0										EMPTY												
	Z	-	_	Z	Ε	R	0	Ε	S	::	:-:::	0	9	8	7	6	5	4	3	2	1	0			
	Z	-	-	Z	E.	R	0	Ε	S	_	-	Z	_	1	Z	E	R	0	Ε	S	_	_			
	Z	-		Ζ	Ε	R	0	Ε	S		. (	Z			Z	E	R	0	E	S	-	_			
	Z	:		Z	Ε.	R	0	Ε	S	_	1	Z	-	-	Ζ	E	R	0	E	S	-	_			
:	Ζ	-	-	Z	Ε	R	0	Ε	S	-		Z	_	-	Z	Ε	R	0	E	S	-	_			
	Ζ	1	-	Ζ	Ε	R	0	Ε	S	:-:	. –	Z	: <del>-</del> :	<u>. :-</u>	Z	Ε	R	0	E	S	_	-			
271	Z	-	-	Z	Ε	·R	0	E	S	-	_	Z	_	_	Ζ	Ε	R	0	Ε	S	_	_			
271	₩	9	8	7	6	5	4	.3	2	::1:	0	Z	+		Z	Ε	R	0	E	S	_				
	1	9	8	7	6	5	4	3	2	1	0	1	9	8	7	6	5	4	3	2	1	0			
	2	9	8	7	6	5	4	3	2	1	0	2	9	8	7	6	5	4	3	2	1	0			

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FIG. 27